



# Purpose

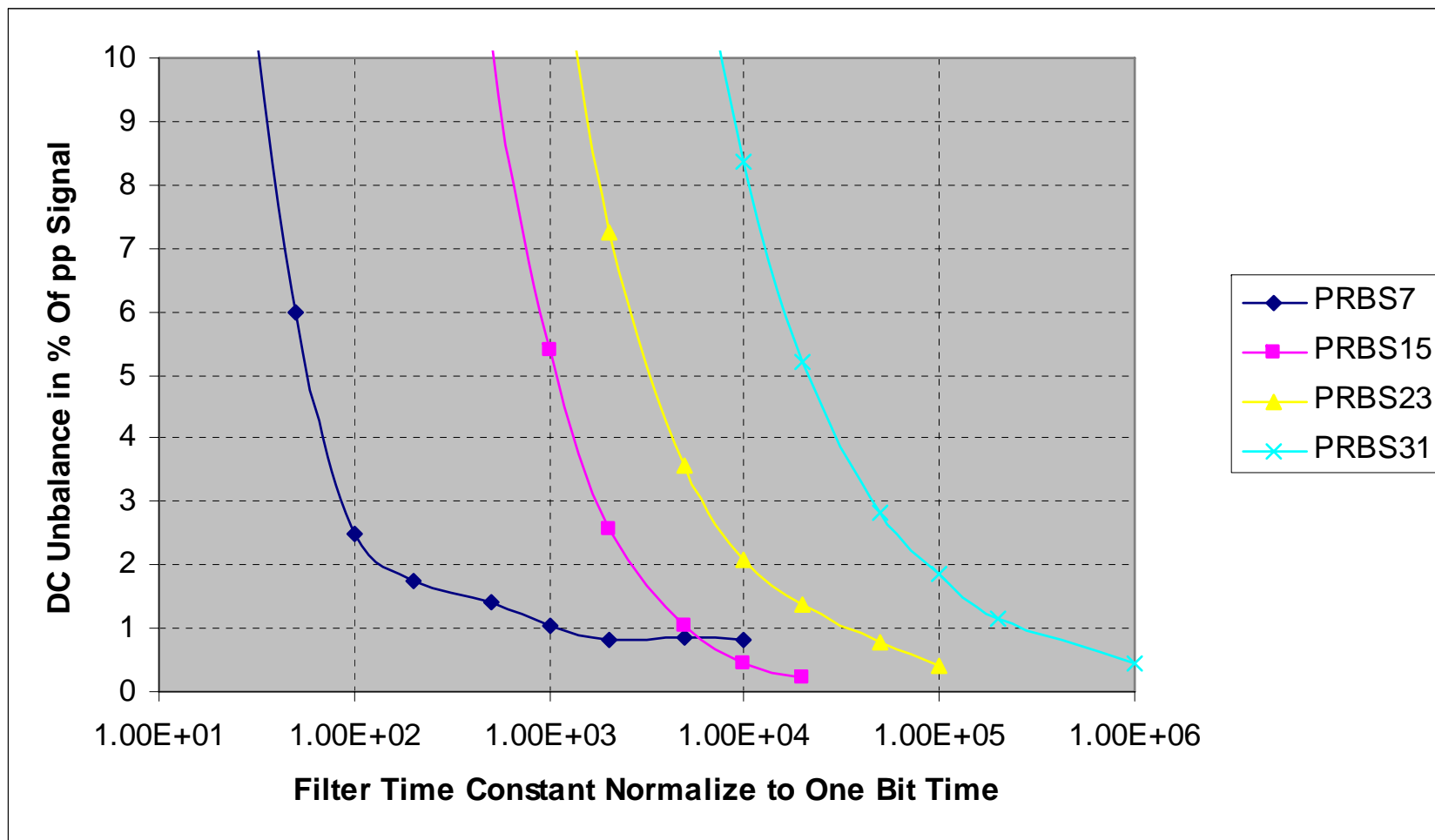
- Related To Comment on AC Coupling
- 10GBase-KR Uses PRBS31 Test Pattern
- Long PRBS Sequences With AC-Coupling Can Cause DC Imbalance = Additional ISI
- Question: How Much Imbalance Versus Circuit Time Constant ?

# Procedure

- Generate the PRBS
- Slide a Window of Size N Through the PRBS
- Find Max Number of 1's Over all Positions of the Window
- Change Window Size and Repeat
- Imbalance = Max Number of 1's Versus N
  - Small N → Large Imbalance
  - Large N → Number 1's Approaches N/2, Imbalance Approaches 0
- $N \cdot (\text{Bit Time}) / 4$  Represents a 'Time Constant'
  - Factor of 4 Used Because Exponential Charging of Capacitor Takes Roughly 4 Time Constants to Complete

(Acknowledgement : C Program Provided by PMC-Sierra)

# Result



# Example Calculation

- Use PRBS31
- Use Max DC Imbalance of 3 %
- Need  $T = 5e4 * 100 \text{ pS} = 5 \text{ microsec}$
- For  $R = 50 \text{ ohm}$ ,  $C = 5 \text{ microsec} / 50 \text{ ohm} = 0.1 \text{ ufd}$